EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Dr. Victoria Donnelly on Monday, 16 March 2009. The application has been amended as follows:

In the claims (underlined portions are additions, strikethrough portions are deletions; these amendments are applied to the version of the claims filed on 15 December 2008)

Claim 33. A method for monitoring lightpaths in an optical network comprising a plurality of optical nodes, each associated with a respective nodal identifier, said optical nodes interconnected by wavelength-multiplexed links and exchanging control signals through a control network, the method comprising the steps of:

modulating an optical signal of each lightpath by an identifying optical signature;

storing at each optical node~~, for each lightpath planned to traverse said each optical node~~:

~~an~~ identifiers of ~~a respective~~ optical signatures of specific lightpaths designated to traverse said each optical node; ~~and~~

identifiers of adjacent optical nodes designated to be along ~~said~~ each lightpath from among said specific lightpaths; and

identifiers of optical signatures detected at said each optical node;

selecting, by a command-line interface communicatively coupled to a start optical node, a target lightpath connecting a source optical node to a destination optical node and traversing said start optical node;

~~and a start optical node along said target lightpath, and at a command-line interface communicatively coupled to said start optical node:~~

determining, by said command-line interface, a target optical signature stored at said start optical node and associated with said target lightpath;

progressively communicating a first message comprising said target optical signature to adjacent optical nodes to determine a first sequence of optical nodes designated to form said target lightpath;

progressively communicating a second message comprising said target optical signature to adjacent optical nodes to determine a second sequence of optical nodes actually receiving said target optical signature; and

comparing said second sequence to said first sequence;

~~wherein said start optical node is an intermediate optical node between a source optical node and a destination optical node of said target lightpath, and wherein said first sequence is determined as:~~

~~a list of preceding nodes, each storing an identifier of said target optical signature, between said start optical node and said source optical node; and~~

~~a list of succeeding nodes, each storing an identifier of said target optical signature, between said start optical node and said destination optical node~~

and

wherein the steps of determining, progressively communicating the first message, progressively communicating the second message, and comparing are performed without interacting with a centralized network management system.

Claim 34. A The method of claim 33 ~~for monitoring lightpaths in an optical network comprising a plurality of optical nodes, each associated with a respective nodal identifier, said optical nodes interconnected by wavelength-multiplexed links and exchanging control signals through a control network, the method comprising the steps of:~~

~~modulating an optical signal of each lightpath by an identifying optical signature;~~

~~storing at each optical node, for each lightpath planned to traverse said each optical node:~~

~~an identifier of a respective optical signature; and~~

~~identifiers of adjacent optical nodes designated to be along said each lightpath;~~

~~selecting a target lightpath connecting a source optical node to a destination optical node and a start optical node along said target lightpath, and at a command-line interface communicatively coupled to said start optical node:~~

~~determining a target optical signature stored at said start optical node and associated with said target lightpath;~~

~~progressively communicating a first message comprising said target optical signature to adjacent optical nodes to determine a first sequence of optical nodes designated to form said target lightpath;~~

~~progressively communicating a second message comprising said target optical signature to adjacent optical nodes to determine a second sequence of optical nodes actually receiving said target optical signature; and~~

~~comparing said second sequence to said first sequence;~~

~~wherein said start optical node is an intermediate optical node between a source optical node and a destination optical node of said target lightpath, and~~

wherein said second sequence is determined as:

a list comprising each preceding node which detects said target optical signature along said target lightpath between said start optical node and said source optical node; and

a list comprising each succeeding node which detects said target optical signature along said target lightpath between said start optical node and said destination optical node.

Claim 35. A method for monitoring lightpaths in an optical network comprising a plurality of optical nodes, each associated with a respective nodal identifier, said optical nodes interconnected by wavelength-multiplexed links and exchanging control signals through a control network, the method comprising the steps of:

modulating an optical signal of each lightpath by an identifying optical signature;

storing at each optical node, for each lightpath planned to traverse said each optical node:

an identifier of a respective optical signature; and

identifiers of adjacent optical nodes designated to be along said each lightpath;

selecting a target lightpath connecting a source optical node to a destination optical node and a start optical node along said target lightpath, and ~~at~~ by a command-line interface communicatively coupled to said start optical node:

determining a target optical signature stored at said start optical node and associated with said target lightpath;

progressively communicating a first message comprising said target optical signature to adjacent optical nodes to determine a first sequence of optical nodes designated to form said target lightpath;

progressively communicating a second message comprising said target optical signature to adjacent optical nodes to determine a second sequence of optical nodes actually receiving said target optical signature; and

comparing said second sequence to said first sequence;

wherein the step of progressively communicating said first message further comprises:

identifying at said start optical node a current node ~~adjacent to said start optical node~~ towards said source optical node and designated to be on said target lightpath according to provisioning data stored at said start optical node;

sending said first message from said start optical node to said current node, said current node being adjacent to said start optical node;

responsive to an indication that said current node is said source optical node, ~~sending from said current node a completion indication to said start optical node~~ receiving at said start optical node a completion indication from said current node;

responsive to an indication that said current node is not said source optical node:

~~identifying at said current node a preceding node adjacent to said current node and designated to be on said target lightpath according to provisioning data stored at said current node;~~

~~sending, from said current node, an identifier of said preceding node to said start optical node;~~

receiving, at said start optical node, an identifier of an identified preceding node from said current node, said preceding node being adjacent to said current node and designated to be on said target lightpath according to provisioning data stored at said current node;

setting said preceding node as a current node; and

returning to the step of sending said first message.

Claim 36. The method of claim 35 wherein the step of progressively communicating said first message further comprises:

identifying at said start optical node a current node ~~adjacent to said start optical node~~ towards said destination optical node and designated to be on said target lightpath according to provisioning data stored at said start optical node;

sending said first message from said start optical node to said current node, the current node being adjacent to said start optical node;

responsive to an indication that said current node is said destination optical node,

~~sending from said current node a completion indication to said start optical node~~

receiving at said start optical node a completion indication from said current node;

responsive to an indication that said current node is not said destination optical node:

~~identifying at said current node a succeeding node adjacent to said current node and designated to be on said target lightpath according to provisioning data stored at said current node;~~

~~sending, from said current node, an identifier of said succeeding node to said start optical node;~~

receiving, at said start optical node, an identifier of an identified succeeding node from said current node, the succeeding node being adjacent to said current node and

designated to be on said target lightpath according to provisioning data stored at said current node;

setting said succeeding node as a current node; and

returning to the step of sending said first message.

Claim 37. A method for monitoring lightpaths in an optical network comprising a plurality of optical nodes, each associated with a respective nodal identifier, said optical nodes interconnected by wavelength-multiplexed links and exchanging control signals through a control network, the method comprising the steps of:

modulating an optical signal of each lightpath by an identifying optical signature;

storing at each optical node, for each lightpath planned to traverse said each optical node:

an identifier of a respective optical signature; and

identifiers of adjacent optical nodes designated to be along said each lightpath;

selecting a target lightpath connecting a source optical node to a destination optical node and a start optical node along said target lightpath, and ~~at~~ by a command-line interface communicatively coupled to said start optical node:

determining a target optical signature stored at said start optical node and associated with said target lightpath;

progressively communicating a first message comprising said target optical signature to adjacent optical nodes to determine a first sequence of optical nodes designated to form said target lightpath;

progressively communicating a second message comprising said target optical signature to adjacent optical nodes to determine a second sequence of optical nodes actually receiving said target optical signature; and

comparing said second sequence to said first sequence;

wherein the step of progressively communicating said second message further comprises:

identifying at said start optical node a current node ~~adjacent to said start optical node~~ towards said source optical node and designated to be on said target lightpath according to provisioning data stored at said start optical node;

sending said second message from said start optical node to said current node, said current node being adjacent to said start optical node;

responsive to an indication of absence of said target optical signature at said current node,

~~sending from said current node a completion indication to said start optical node~~

receiving at said start optical node a completion indication from said current node;

responsive to an indication that said current node is said source optical node,

~~sending from said current node a completion indication to said start optical node~~

receiving at said start optical node a completion indication from said current node;

responsive to an indication that said current node is not said source optical node:

~~identifying at said current node a preceding node adjacent to said current node and designated to be on said target lightpath according to provisioning data stored at said current node;~~

~~sending, from said current node, an identifier of said preceding node to said start optical node;~~

receiving, at said start optical node, an identifier of an identified preceding node from said current node, said preceding node being adjacent to said current node and designated to be on said target lightpath according to provisioning data stored at said current node;

setting said preceding node as a current node; and

returning to the step of sending said second message.

Claim 38. The method of claim 37 wherein the step of progressively communicating said second message further comprises:

identifying at said start optical node a current node ~~adjacent to said start optical node~~ towards said destination optical node and designated to be on said target lightpath according to provisioning data stored at said start optical node;

sending said second message from said start optical node to said current node, the current node being adjacent to said start optical node;

responsive to an indication of absence of said target optical signature at said current node,

~~sending from said current node a completion indication to said start optical node~~

receiving at said start optical node a completion indication from said current node;

responsive to an indication that said current node is said destination optical node,

~~sending from said current node a completion indication to said start optical node~~

receiving at said start optical node a completion indication from said current node;

responsive to an indication that said current node is not said destination optical node:

~~identifying at said current node a succeeding node adjacent to said current node and designated to be on said target lightpath according to provisioning data stored at said current node;~~

~~sending, from said current node, an identifier of said succeeding node to said start optical node;~~

receiving, at said start optical node, an identifier of an identified succeeding node from said current node, said succeeding node being adjacent to said current node and designated to be on said start target lightpath according to provisioning data stored at said current node;

setting said succeeding node as a current node; and

returning to the step of sending said second message.

Claim 39. The method of claim 33 further comprising:

sending, from ~~a~~ said command-line interface communicatively coupled to said start optical node, messages to all neighbouring nodes of said start optical node requesting each to indicate

detection of said target optical signature, said all neighbouring nodes being discovered via topology information acquired through said control network;

receiving, at said start optical node, acknowledgments from specific neighboring nodes which detect said target optical signature;

adding identifiers of said specific neighboring nodes to a local-discovery list, said local-discovery list being initially an empty list;

sending, from each specific neighboring node, messages to all successive neighboring nodes of said each specific neighboring node requesting indication of detection of said target optical signature, wherein said each successive neighboring node is discovered from available topology information;

receiving, at said start optical node, an acknowledgment from each successive neighboring node which detects said target optical signature; and

adding an identifier of said each successive neighboring node which detects said target optical signature to said local-discovery list;

wherein said each successive neighboring node which detects said target optical signature responds only once to a request for indication of detection of said target optical signature.

Claim 40. The method of claim 33 further comprising:

storing at said each start optical node a set of identifiers of all optical nodes in said optical network;

sending a message from a said command-line interface communicatively coupled to said start optical node to each other optical node, said message containing an identifier of said target optical signature and an identifier of said start optical node, said message requesting each individual optical node which detects said target optical signature, to send a response to said start optical node said response including an identifier of said each individual optical node; and

including said identifier of said each individual optical node which detects said target optical signature in a global-discovery list for comparison with said second sequence of optical nodes.

Claim 41. (New) The method of claim 33, wherein said first sequence is determined as:

a list of preceding nodes, each storing an identifier of said target optical signature, between said start optical node and said source optical node; and

a list of succeeding nodes, each storing an identifier of said target optical signature, between said start optical node and said destination optical node.

In the specification (underlined portions are additions, strikethrough portions are deletions)

On p. 2, paragraph [0004]: replace "15 February 2002" with "15 February ~~2002~~ 2000".

In the abstract (underlined portions are additions, strikethrough portions are deletions)

Replace all prior versions of the abstract with the following:

A method for monitoring lightpaths in an optical network comprising nodes interconnected by wavelength-multiplexed links is disclosed. Each lightpath is identified by a respective optical signature. A node stores identifiers of optical signatures of lightpaths designated to traverse the node and identifiers of adjacent nodes. Each node also maintains a record of all optical signatures it detects. A command-line interface associated with a selected node tracks a selected lightpath, designated to traverse the selected node, by propagating messages in an upstream direction, a downstream direction, or both, requesting other nodes to provide information pertinent to the selected lightpath. The selected node may also send messages to all its neighbouring nodes requesting each to indicated detection, or otherwise, of the selected lightpath. Thus, the method relies on localized information, maintained at each node, and cooperative exchange of data among nodes without interacting with a centralized network management facility.

Drawings

2. Replacement drawing sheets were received on 13 March 2009. These drawings are approved.

Conclusion

3. The references made of record and not relied upon are considered pertinent to applicant's disclosure.

Saleh (U.S. Patent No. 6,973,023 B1) is cited to show the storage of a database on a master node of a network (abstract).

Feutz et al. (U.S. Patent Application Publication No. 2006/0031573 A1) is cited to show teachings for autodiscovery of a network path (abstract).

Won (U.S. Patent No. 7,035,544 B1) is cited to show teachings for identifying particular channels of a wavelength division multiplexed optical network (abstract).

Sharma (U.S. Patent No. 7,218,852 B1) is cited to show teachings for optical light path discovery (abstract).

Saunders et al. (U.S. Patent No. 7,242,862 B2) is cited to show a network diagnostic tool for an optical network that uses channel trace information (Fig. 5).

Bardalai et al. (U.S. Patent Application Publication No. 2008/0008102 A1) is cited to show teachings for tracing an optical path of a communication network (abstract).

Gerstel et al. (U.S. Patent Application Publication No. 2008/0131126 A1) is cited to show teachings for tracking wavelengths in a wavelength division multiplexed optical network (abstract).

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID S. KIM whose telephone number is (571)272-3033. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth N. Vanderpuye can be reached on 571-272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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